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THE COTTONWOOD LEAF BEETLE.

(*Plagiodera scripta* Fabr.)

By W. Osburn, Student in the University of Kansas.

Beetles are certainly remarkable for their various methods of obtaining sustenance in the larval state. Some live in the ground, feeding upon the roots of plants, some are wood-borers, and others feed upon decaying animal and vegetable matter; some live upon fruit, some are cannibals, devouring other insects, and others still feed upon the leaves of plants. The last method of obtaining sustenance is characteristic of the Chrysomelidae family of beetles, to which belongs the above species. On July 22, 1875, we discovered *Plagiodera scripta* in the imago state, its eggs, the young, and full-grown larvae, and the pupae, all upon the same willow bush, so that we are enabled to give quite a full history of its habits and transformations.

The eggs are laid in batches, containing from ten to twenty eggs each, upon the under sides of the leaves. When first hatched the larvae are 0.12 of an inch in length, and black. After the first moult, the head is dark brown and the abdomen dusky. The food plants are the willow and cottonwood. Like the larvae of the Colorado potato beetle, they are voracious feeders, a comparatively small number being sufficient to defoliate a tree of considerable size, and were they as numerous as the noted enemy to the potato vine, the damage done by them would be of no little moment. They eat into the side of the leaf, leaving the stem and veins naked. The first lot of beetles was raised from the willow, entering the pupa July 25th, and emerging July 30th.

On August 12th we captured two litters of larvae upon the cottonwood, which had evidently just hatched, judging from the uneaten condition of the leaves upon which they were found. These entered the pupa August 20th, and came forth perfect beetles August 26th, thus making the time required for their total transformation about fifteen days, and establishing the certainty of at least two broods in a season. The most prominent peculiarity of the larva consists in the white fleshy organs which are thrust out from the tip of the abdomen and from the dark-brown tubercles on the sides of the body. What may be the exact use of these organs, especially of those upon the sides of the body, we are unable to tell. They find an analogy in the organs of the *Ajax* butterfly (*Papilio Ajax*), and the *Asterias* butterfly (*Papilio Asterias*). Like the organs of these butterflies, they give forth a strongly-scented secretion, and from this we might infer that they were a means of defense. One thing is certain, however, that the organ from the abdomen is made use of in pupation, for, this being extended, it is glued fast to the under side of some twig. The larva then only partially sheds its skin, one-fourth of the body remaining within the old skin, to which it is stuck fast. Thus, like the chrysalides of many butterflies, the pupae remain suspended until the imagoes come forth. The following are descriptions of three of the different stages of the insect:

Egg.—Length, 0.06 in. Diameter, 0.015 in. Elliptical in shape, and transparent green in color.

Larva.—Length, 0.50 in. Circumference, 0.35 in. Head dark brown, circular, and much smaller than the body. General color of body light yellowish brown; feet dark brown, with an encircling band of light brown near the base; a convexo-concave patch of dark brown on the top of the first

thoracic segment; a short tuberculous spine of dark-brown on each side of the second and third thoracic segments, from which is projected a white, fleshy organ; a sub-dorsal row of dark brown spots, two spots to each segment in the second and third thoracic segments and one in the remaining segments, the spots of the two rows uniting in the eleventh, twelfth, and thirteenth segments and forming one oblong spot; below this, extending from the fifth segment to the last, is a row of dark brown tubercles, one tubercle to each segment; a lateral row of dark brown spots, one spot to each of the last nine segments, below which is a row of dark brown tubercles, one tubercle to each segment, except the second and third thoracic, which have two each; below the latter are two rows of dark brown spots, one spot to each segment, and finally a ventral row of dark brown elongated spots, one to each segment; abdomen provided with a white, viscid, fleshy organ, capable of being extruded.

Pupa.—Length, with the old skin of the larva, 0.50 in. True length, 0.31 in. General color, light brown; head, centre of thorax, and feet, dark brown.

THE ROCKY MOUNTAIN LOCUST.

(*Caloptenus spretus* Uhler.)

By Prof. F. H. Snow.

Now that this scourge of vegetation has taken its departure, I desire to put upon record a few observations of the past two months.

Upon the sixth of April I discovered the first young locusts, upon the southern slope of Mount Oread, just beyond the limits of the city of Lawrence (latitude $38^{\circ} 58'$; longitude $95^{\circ} 16'$.) This elevation is the termination of the high prairie, forming one of the bluffs at the intersection of the valleys of the Kansas and Wakarusa rivers. When first observed, the young locusts in myriads were at rest upon the ground, some of them, however, feeding upon the leaves of the Indian Plantain (*Cacalia tuberosa*). They were very diminutive in size, and when disturbed by my walking among them, would hop only two or three inches high, looking very much like the grains of sand in rapid motion upon a vibrating acoustic plate. The hatching took place, I soon learned, not only on the slopes of the bluffs, but also in many spots in the "bottom" land, along roadsides and in fields of grass and grain. It was two weeks after the first hatching of the Mount Oread colony that Mr. W. Osburn caught one hundred and ninety individuals at one sweep of the hand.

Not until about the tenth of May did the young locusts begin to move from their hatching grounds and cause serious apprehension among the farmers for the safety of their crops. At this time combined and systematic effort in neighborhoods infested would have prevented a large portion of the destruction which ensued. By the twentieth of May it became evident that the various colonies of locusts would consume everything in the line of their march and that their ravages would only be arrested by their departure upon gaining their wings. Even at this late day, however, many were able to save portions of their crops by the ditching process. By this method